CERTIFICATE OF SERVICE

I hereby certify that on this 26th day of January, 1998 a copy of "Petition of Bell Atlantic" was served on the parties on the attached list.

Tracey M. DeVaux

Tracey M. DeVaux

* Via hand delivery.

Gloria Tristani, Commissioner*
Federal Communications Commission
1919 M Street, NW
Room 826
Washington, DC 20554

Harold Furchtgott-Roth, Commissioner*
Federal Communications Commission
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Michael Powell, Commissioner*
Federal Communications Commission
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Susan Ness, Commissioner*
Federal Communications Commission
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William E. Kennard, Chairman*
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ATTACHMENT 1

DECLARATION OF PROF. THOMAS W. HAZLETT

1) My name is Thomas W. Hazlett, and I teach economics, finance and public policy at the University of California, Davis. My Ph.D. is in economics from UCLA (1984), and I served as Chief Economist of the Federal Communications Commission in 1991-92. I am a Senior Research Fellow at the Columbia Institute for Tele-Information at the Columbia University Graduate School of Business, and I am an adjunct scholar at the American Enterprise Institute for Public Policy Research in Washington, D.C. My curriculum vitae is attached.

2) Section 706 of the Telecommunications Act of 1996 makes the rapid development of advanced telecommunications infrastructure a national priority. It directs the FCC and state regulators to "encourage the deployment [of] high-speed, switched, broadband telecommunications capability" to "all Americans,"[1] including "in particular, elementary and secondary school and classrooms," "on a reasonable and timely basis." The "advanced telecommunications capability" called for in the Act must "enable[] users to originate and receive high-quality voice, data, graphics, and video telecommunications."[2] The former chairman of the FCC, Reed Hundt, described this network as "a high-speed, congestion-free, always reliable, friction-free, packet switched, big bandwidth, data friendly network that is universally available, competitively priced, and capable of driving our economy to new heights."[3]

3) I have been asked by Bell Atlantic to submit a declaration to the FCC which analyzes the competitive aspects of the current restrictions prohibiting Bell Operating Companies from supplying high-speed inter-LATA telecommunications transport services. My analysis focuses on the issues raised by the proposed mergers involving WorldCom, MCI, and other Internet backbone suppliers, and is hereby submitted to the Commission. Please note that a White Paper prepared by Bell Atlantic, a document which explores the factual issues involved in the Internet infrastructure discussion in some detail, is Attachment 2.

THE RAPID EMERGENCE OF AN IMPORTANT NEW COMMUNICATIONS MEDIUM

4) The Internet is probably the most important development in mass communications of our time. The Net promises to become a major source of economic efficiency, as well as a major driver of economic growth, both in the United States and around the globe. The rapid adoption of technologies which allow businesses and individuals to access the Internet is truly astounding. The Net had 19 million host computers in July 1997, over 20 times the number five years

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[1] Telecommunications Act of 1996, §706 (codified as a note following 47 U.S.C. 157).

[2] *Id.* at §706(a).

[3] Reed Hundt, "The Internet: From Here to Ubiquity," Speech to the Institute of Electrical and Electronics Engineers, The Symposium on Hot Chips (26 August, 1997).

earlier.[4] The number of Internet Service Providers (ISPs) in the United States doubled in 1995 alone.[5] The Net serves an estimated 56 million U.S. subscribers today,[6] double what it served a year ago.[7] This stunning growth rate augurs enormous demand for services delivered via on-line networks.

5) Still, a majority of Americans are as yet unconnected to the Net. Moreover, those who are find that electronic traffic often moves sluggishly, as Internet arteries are clogged and congested. Typical download speeds are frustratingly slow for simple text and graphics, and prohibitively expensive (in terms of time costs) for many applications involving audio, video, and interactive technologies. Those firms supplying Internet backbone capacity have proven unable to stay ahead of demand. The result has been that customers with 33.6 kbps modems are rarely able to access the Internet at speeds even approaching the capacity of their local access line. (See Appendix 2 for a detailed description by Bell Atlantic of the current capacity constraints limiting Internet communications.) Large business customers which are willing to invest in high-capacity local area networks can overcome some constraints, but even these Internet users are limited by the congestion problems encountered when dealing with consumers, suppliers, or other correspondents via the Internet. As CNET reports:

> Like a Ferrari stuck in a traffic jam, the performance of next-generation online communications devices such as 56 kbps, cable, or satellite modems is being sharply limited by the strained capacity of the Internet and its inability to respond to peak load conditions....
>
> A recent survey by Keynote Systems showed that Web documents traveled through the Internet at average speeds of 5,000 characters per second, or 40 kbps – more slowly than these new, widely touted 56-kbps modems. In addition, most users may see slower speeds because the Keynote measurements were taken over T1 or T3 lines from locations only one or two "router hops" away from a Net backbone...[8]

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[4] Network Wizards, "Internet Domain Name Survey" (July 1997), http://www.nw.com/.

[5] Kevin Werbach, "Digital Tornado: The Internet and Telecommunications Policy," Office of Plans and Policy, Federal Communications Commission, OPP Working Paper 29 (March 1997) at 21. A host used to be a single machine on the Net. Today, a single machine may host multiple systems (with multiple domain names and IP addresses).

[6] Intelliquest, "Latest IntelliQuest Survey Reports 56 Million American Adults Access The Internet/Online Services" (18 Nov., 1997), www.intelliquest.com.

[7] Remarks by the President of the United States to the People of Knoxville (10 October, 1996), www.pub.whitehouse.

[8] Jeff Pelline, "Net Jams Hinder Faster Connections," CNET (22 October, 1997), www.news.com.

6) Whatever the future holds, the Internet is plainly not now an important conduit for voice traffic. And today's voice network is plainly not the "advanced capability" network contemplated by Congress in Section 706. As former chairman Hundt has noted, "Today's network is not the new species of communications network that I'm hoping for and that the country needs."[9] "We need a data network that can easily carry voice, instead of what we have today, a voice network struggling to carry data."[10]

THE INTERNET'S DECENTRALIZED ARCHITECTURAL DESIGN

7) The Internet has famously evolved in spontaneous fashion, originating from a system of network-linking protocols developed for Defense Department research and high-capacity telecommunications conduits created for academic communications. While these early building blocks were conceived by a process that involved explicit coordination and government subsidy, the growth of the Internet beyond a small consortium of scholarly research institutions has proceeded due to unforeseen market forces and commercial applications (including excess capacity among long-distance competitors, the emergence of local area networks, the purchase of millions of high-speed personal computers, email and web-browsing software) which were no part of any conceptual Internet "plan."[11] Indeed, commercial use of the Internet was long resisted by policymakers.[12]

8) As of April 1995, the National Science Foundation ended subsidization of the Internet "backbone" – high-capacity trunk lines which link key nodes. The NSF's support system was replaced by ANS, then owned by America On-Line, and a number of other privately-owned backbone systems linking four Network Access Points (NAPs) in San Francisco, Chicago, New York, and Washington, D.C.[13] Since then, this "network of networks" has increasingly relied on voluntary agreements between transportation providers to offer interconnection on a non-discriminatory basis.[14] This system has worked because the incentive for each provider of

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[9] Reed Hundt, "The Internet: From Here to Ubiquity," Speech to the Institute of Electrical and Electronics Engineers, The Symposium on Hot Chips (26 August, 1997).

[10] *Id.*

[11] K. Hafner and M. Lyon, Where Wizards Stay Up Late: The Origins of the Internet (Simon & Schuster, 1996).

[12] Herb Brody, "Internet @ Crossroads.$$$," Technology Review (May/June 1995); E. Weise, "As Net Goes Public, Uncertainty Reigns," *San Francisco Examiner* (5 Sept., 1994), B1.

[13] J. Rickard, "Internet Architecture," Boardwatch Magazine Directory of Internet Service Providers (July/Aug., 1997), at 8.

[14] "[T]he NSF declined to address the concept of 'peering.' While the NAPs provided a place of interconnection, anyone at a NAP can choose to interconnect with anyone else there, or for that matter, decline to. Today, you can rather easily get a connection to the NAP, but it is

transport service has been to connect with all others. This is a product of the fact that each provider of transport services earns its revenues by providing access to businesses and households, and the gain to be had by offering access to the total universe of Internet services and subscribers has dominated the opportunity which any backbone supplier has had to raise price above competitive levels.

CONCENTRATION OF INTERNET BACKBONE SUPPLY

9) It is possible, however, that such symmetric incentives to interconnect are changing. The emergence of a dominant Internet backbone provider raises concerns that a single network (or alliance of networks) will achieve the critical mass to impose discriminatory interconnection charges. Many Internet Service Providers allege that this economic shift was already under way by the Spring of 1997, when the large UUNet backbone owned by WorldCom, announced that it was ending its "peering" arrangements with all but a handful of backbone providers – many of whom quickly matched this policy.[15] The net result was that, of 29 backbone providers, only UUNet, ANS, Sprint, MCI, AT&T, BBN-Planet (GTE), CWIX, IBM and PSINet maintained status as peers. The previous system, which amounted to "bill and keep," was replaced with a new pricing policy in which 20 smaller backbone providers were charged fees for interconnection on a non-reciprocal basis.

10) Whether the charges levied on smaller ISPs will spur investment in infrastructure or restrict output (by raising price) remains to be seen. What is clear, however, is that according to the FCC's analysis in many previous instances, the level of concentration now occurring in the Internet backbone market is a cause for concern. Following the contraction of "peerage," WorldCom announced that it would purchase the ANS backbone owned by AOL, as well as the CompuServe backbone (not a peer, but among the 29 national backbone providers). Now pending is the WorldCom purchase of MCI.[16] If consummated, this combination would create a

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quite an 'old boys club' as to who will peer with whom. The issue at the heart of 'peering' is the concept that in peering with you, a vendor is basically agreeing to allow your traffic to transit their backbone to get across country. Most of the backbone operators will only peer with other operators that likewise have a presence at ALL of the NAPs and they are becoming increasingly selective about who they peer with." J. Richard, "Internet Architecture," Boardwatch Magazine Directory of Internet Service Providers (July/Aug., 1997), at 8. See also: Kevin Werbach, "Digital Tornado: The Internet and Telecommunications Policy," Office of Plans and Policy, Federal Communications Commission, OPP Working Paper 29 (March 1997), at 16.

[15] "UUNet Technologies to cut off free conections to its Internet backbone," *Business Wire* (25 April, 1997); Jackie Poole, "Midrange ISP prices climb; UUNet, Sprint end free traffic services," *InfoWorld* (5 May, 1997), at 10.

[16] Michael Fitzgerald, "WorldCom Grabs the Prize," *ZDNet*, www.zdnet.com/zdnn/ (10 November, 1997).

dominant firm in the backbone industry by the Commission's standard industrial market analysis.

11) The Federal Communications Commission has stated: "For determining when concentration reduces competition to an undesirable level, one accepted tool is the Herfindahl-Hirschman Index ("HHI"), which is used in the Department of Justice and Federal Trade Commission Horizontal Merger Guidelines to measure market concentration [footnote]. It has been accepted by courts and this Commission in numerous cases as a preliminary test of permissible and impermissible horizontal concentration [footnote omitted]."[17] The Commission has calibrated the HHI analysis as follows:

- < 1,000: "an HHI of less than 1,000 shows an unconcentrated market, in which horizontal concentration is not a concern"
- 1,000 - 1,800: "an HHI between 1,000 and 1,800 shows a moderately concentrated market, in which certain ownership combinations 'potentially raise significant competitive concerns depending on [certain] factors'
- > 1,800: "an HHI over 1,800 shows a highly concentrated market, in which certain combinations 'are likely to create or enhance market power or facilitate its exercise' unless a strong showing to the contrary is made [footnote]"[18]

While the Herfindahl-Hirschman Index was employed in this context to evaluate the likely competitive effects of concentration among suppliers of wireless telecommunications services, the Commission clearly advanced the framework as generally applicable. Indeed, the Commission has similarly employed both HHI calculations and the Justice Dept.-FTC Merger Guidelines to assess market power in several other sectors. Examples include local video markets,[19] national television advertising and programming markets,[20] national radio ownership,[21] and interexchange markets after the mergers that resulted in the creation of WorldCom.[22]

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[17] Federal Communications Commission, *In the Matter of Amendment of Parts 20 and 24 of the Commission's Rules – Broadband PCS Competitive Bidding and the Commercial Mobile Radio Service Spectrum Cap*, WT Docket No. 96-59 (Adopted 21 June, 1996; Released 24 June, 1996), at Par. 96.

[18] *Ibid.* The passage cites: 1992 Department of Justice - Federal Trade Commission Horizontal Merger Guidelines, 4 Trade Reg. Rep. (CCH) ¶ 20,569, § 1.41.

[19] Third Annual Report, Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, 12 FCC Rcd 4358, 4419-20 (1996).

[20] Report and Order, Review of the Prime Time Access Rules, 11 FCC Rcd 546 (1995).

[21] Second Memorandum Opinion and Order, Revision of Radio Rules and Policies, 9 FCC Rcd 7183, 7185 (1994).

[22] Memorandum Opinion and Order, Applications of WilTel and LDDS, 9 FCC Rcd

12) Under this analysis, the Internet backbone market is highly concentrated and becoming more so. The WorldCom/MCI merger would reportedly create a firm accounting for between one-half and four-fifths of U.S. Internet traffic. Because acquiring Internet traffic data is extremely difficult, I have had to rely on the reports issued by Internet industry experts (as reported in the press), to discern this range. I have reported those estimates in the following table, and have calculated minimum HHI levels under the assumption that the residual market is perfectly deconcentrated. Note that the likely post-merger backbone concentration ratio is likely to rise to well above 3000. On average, the post-merger HHI is twice that identified in the Merger Guidelines as indicating a market which is "very concentrated." Such combinations receive very high levels of scrutiny by antitrust authorities and those analyzing competition issues for the Federal Communications Commission under the standard analysis.

6810, 6812 n.26 (I.B. 1994).

Estimates of Market Concentration in the Internet Backbone Following a WorldCom/MCI Merger

Boardwatch Magazine Survey Jon Healey, "MCI Bid Puts Net at Stake," San Jose Mercury News (10/2/97)	51%	2601
Information Week Mary Thyfault & Beth Davis, "Users Assess WorldCom's $30 Billion Bid for MCI," Information Week (10/6/97)	49%	2401
Industry experts George Mannes, "Wall St. Worldcom Beater, Internet Worries Linked to Prices," New York Daily News (10/3/97)	("up to") 80%	6400
Decision Resources, Inc. "WorldCom Tops Its $20 Billion, 20 Month Spending Spree With a $30 Billion Bid for MCI," PR Newswire (10/3/97)	("at least") 60%	3600
Inter@ctive Week Wilson & R. Barrett, "Proposed Colossus Craves International Reach," Inter@ctive Week (10/6/97)	("more than") 50%	2500
Wall Street Journal Thomas E. Weber and Rebecca Wuick, "Would WorldCom-MCI Deal Lift Tolls on Net?" Wall Street Journal (10/2/97)	("more than") 60%	3600
Arlen Communications "Rival's Bid for MCI – Nearly $30 Billion," Sacramento Bee (10/2/97)	("over") 70%	4900
MEAN	**60%**	**3600 (3715)***

***Mean of calculated HHIs, as opposed to HHI calculated from mean of market share estimates.**

13) It should also be noted how conservative is the assumption of an atomistically competitive residual. *Boardwatch Magazine* estimates that the MCI and WorldCom-owned UUNet backbones handle 51% of U.S. Internet traffic (see first line of table). *Boardwatch* also estimates

that Sprint has a 24% market share.[23] Adding Sprint and two smaller suppliers to the analysis (AGIS and BBN) would raise the estimated HHI by well over 600. Hence, it is highly unlikely that the HHI, by any full set of market share estimates, is under 3000.

14) While concentration levels alone are not sufficient to establish anti-competitive effects, there is some reason to believe that the WorldCom/MCI merger will result in higher prices for customers. As reported by a number of Internet analysts, the attempted combinations reach critical mass for pricing policies which substantially exploit the market power of incumbent backbone providers. As the *Wall Street Journal* reports:

> For the first time, a single company is within reach of dominating the innards of the Internet. If WorldCom Inc. succeeds in its surprise bid to acquire MCI Communications Corp., the combined company would control more than 60% of all U.S. traffic on the global computer network... That kind of market dominance would give WorldCom an unprecedented level of clout and, potentially, pricing power over the Internet.[24]

Several market analysts predict that the WorldCom/MCI combination will both raise the price of Internet access and the quality of service, thus producing a theoretically ambiguous change for consumers. Reuters reported the proposed merger this way: "If WorldCom Inc. succeeds in its $35 billion takeover of MCI Communications Corp., Internet access is likely to improve, but the deal could accelerate a trend toward higher prices, analysts said..."[25] A commentary by Internet consultant Mitch Ratcliffe on the ZDNet News Channel was harsher: "WorldCom's hostile takeover bid for MCI could very well yield a 'we-pay-more' online world, we being you and me and everybody else online. At the least, it signals a drastic change in the balance of power between the users and the providers of Internet service, as well as between smaller ISPs and the newly dominant backbone provider that WorldCom/MCI represents. The change could be very bad for data network customers (i.e., anyone who sends E-mail)."[26]

15) This concentration may be of particular concern in a "network of networks" where powerful scale economies are present. According to an FCC Working Paper, the explosive growth of the Internet is being driven by two re-inforcing effects: Moore's Law and Metcalfe's Law. The first propounds that microchip computing efficiencies double roughly every 18 months, in constant

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[23] Jon Healey, "MCI Bid Puts Net at Stake," *San Jose Mercury News* (2 October, 1997), www.sjmercury.com/business/mci100297.htm.

[24] Thomas E. Weber and Rebecca Quick, "Would WorldCom - MCI Deal Lift Tolls on Net?" *Wall Street Journal* (2 October, 1997), B1.

[25] Therese Polettei, "WorldCom/MCI Deal May Improve Internet Access at Higher Cost," (3 October, 1997), *Nando.net*, www.nando.net/newsroom.

[26] Mitch Ratcliffe, "WorldCom Takeover Bid a WorldBomb?" *ZDNet*, www.zdnet,com/zdnn (3 October, 1997).

dollar terms, creating a steeply-increasing utility curve for users of interactive services over time. The second postulates that the value of a network, such as the Internet, increases with the square of its size. This means that as new members "join the club," existing members also gain by being part a bigger, better network: value *per member* increases.[27] This makes for explosive aggregate growth of a decentralized Internet, yet also (through Metcalfe's Law) raises the possibility that the bargaining strength of sufficiently concentrated backbone providers may emerge to offset at least some of that growth by extracting higher prices for access to their large-scale networks.

Sec. 706. ADVANCED TELECOMMUNICATIONS INCENTIVES.

16) Regardless of whether WorldCom completes its proposed merger with MCI, and whether or not further mergers of backbone providers take place in the near term, there is a policy adjustment available to the Federal Communications Commission which would improve competitiveness within the sector.[28] That is to act under Congress' directive in Section 706 of the 1996 Telecommunications Act to "encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms) by utilizing, in a manner consistent with public interest, convenience, and necessity, price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment." By permitting Bell Atlantic to compete in the provision of Internet backbone services the Commission would be inviting a large-scale entrant to provide the investment in infrastructure which is likely to be demanded by customers, but which may not be so quickly forthcoming from a "highly concentrated" backbone sector.

17) Note that RBOCs have powerful incentives to improve the capacity of long-distance Internet traffic, because higher speeds on the longer hauls increase demand for local bandwidth. This incentive has been observable within the marketplace; GTE, a large-scale local exchange company unencumbered by BOC restrictions, has been a substantial investor in Internet backbone facilities.[29] Interestingly, AT&T has had a presence in the backbone market which is

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[27] Kevin Werbach, "Digital Tornado: The Internet and Telecommunications Policy," Office of Plans and Policy, Federal Communications Commission, OPP Working Paper 29 (March 1997), at 6.

[28] In this context, it is important to note that market concentration in the provision of Internet backbone services was a ripe issue for antitrust analysis even before the prospect of the WorldCom/MCI merger. See: Janet Kornblum, "Will WorldCom Own the Backbone Business?" CNET, www.news.com (11 September, 1997).

[29] GTE's investments in backbone capacity demonstrate the level of financial commitment that can be expected from large LECs integrating into the backbone market. After purchasing BBN, GTE paid Qwest nearly $500 million for new fiber capacity, and signed an

modest, relative to its dominance of U.S. long-distance service and its size as the largest telecommunications operator in the world. MCI and Sprint have had much larger relative investments, suggesting that their non-dominant positions in long distance telephony encouraged them to more warmly embrace opportunities to increase traffic on their networks even in the face of the substitution effect tending to diminish demand for long-distance telephony.[30] Were the FCC to grant RBOCs the opportunity to provide Internet backbone services, they would face an incentive structure more resembling that faced by GTE, MCI or Sprint, rather than that faced by AT&T. This would continue to be the case even after a determination by the Commission to allow the RBOCs to compete in long-distance telephony, as such firms would enter IXC markets with long-distance market shares of zero.

18) Intensifying competitive rivalry to induce added investment in the supply of high-capacity, high-speed Internet transport facilities is the one reliable method for accomplishing such pro-consumer results. Competition has historically propelled new investments in advanced telecom capabilities and the delivery of advanced services to every segment of the market. In the long distance voice network of the 1970s and 1980s, regulatory changes permitted MCI and Sprint to enter and compete with the established industry giant, AT&T, and capacity expanded impressively. It was Sprint which pursued such aggressive investment in fiber-optic technology that it forced its larger rivals to upgrade their entire networks. (It is interesting, in the current regulatory context, that Sprint's owners were two local phone companies, GTE and the former United Telecom. It is also of note that such investments in optical transmission conduits greatly facilitated development of the Internet.). In television markets in the1970 and 1980s, cable companies freed from onerous federal restrictions found themselves best able to compete with the established broadcast TV sector by deploying broadband coaxial cable with sufficient bandwidth to increase viewer choice by a factor of 2- to 20-fold. Once they wired the country, however, cable operators themselves found that positions of local monopoly protected them from certain market forces. In particular, firms were slow in serving various low-density sub-markets – unless pressed by a competitor in a "wiring race" to extend local networks. In many instances,

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agreement with Cisco to purchase $1 billion worth of backbone routers over the next five years. T. Poletti, "GTE to Buy BBN and Fiber Optic Network, Sets Cisco Alliance," Reuters Financial Service (6 May, 1997).

[30] Local exchange carriers will naturally embrace Net telephony more enthusiastically than will those firms which begin the competition with substantial long-distance revenues to protect: "Mark Winther, group vice president of worldwide telecommunication at IDC, concurs that the growth of Internet telephony is very significant. 'It's not going to mean much for U.S. phone companies in the local and state-to-state calls,' he said. 'The main advantage will be in long distance calls, especially calls from one foreign country to another.'" Lamia Abu-Haidar, "Telcos Moving In on Net Market," CNET (22 October, 1997), www.news.com.

competition succeeded in getting residences wired for cable when "universal service" mandates imposed on franchise monopolists had failed to work.[31]

19) Similarly, cable operators today faced with the threat of local telephone company entry into their markets have been quick to deploy state-of-the-art digital networks. In three high profile markets – Alexandria, Virginia,[32] Dover Township, New Jersey, [33] and Hartford, Connecticut[34] --- the threat of local telephone company entry into cable markets impelled incumbent cable operators to upgrade existing networks, add channel capacity, and to experiment with new offering such as Internet access and voice capabilities. After entry actually materialized, prices fell substantially – by 25%, for instance, in Dover Township.[35] Similar reactions are occurring in the markets throughout the 50 communities where Ameritech has received local franchises to compete in the multichannel video market.[36]

CONCLUSION

20) The analysis presented herein does not conclude that the WorldCom/MCI merger be opposed by the FCC. Rather, it notes that application of the traditional framework utilized by the Commission and the antitrust agencies reveals very high levels of concentration in the Internet backbone market, and that there are compelling empirical and theoretical grounds for

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[31] *See* Thomas W. Hazlett, "Duopolistic Competition in Cable Television: Implications for Public Policy," *7 Yale Journal on Regulation* (Winter 1990) 65, at 96-97.

[32] "Cable Telephony Trials Planned in Alexandria and Chicago," *Communications Daily* (23 November, 1993), 2.

[33] R. Fazzi, "Bell Atlantic in Cable Picture," *Asbury Park Press* (30 January, 1996), A7; R. Fazzi, "Adelphia Says New Services Coming Soon," *Asbury Park Press* (15 May, 1996), 1; "Adelphia Aggressively Deploying Internet Services," Cable Datacom News (November 1996); R. Gebeloff, "Solutions to Internet Logjams Promised," *The (Bergen) Record* (3 March, 1997), A01.

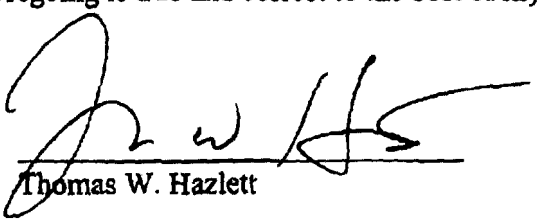
[34] B. Keveney, "TCI Service to Expand Next Month," *Hartford Courant* (20 Dec., 1995), A3; P. Colman, "TCI Rate Hikes Run Gamut," *Broadcasting & Cable* (2 June, 1997), 68.

[35] P. Colman, "Telco Competition Taking Toll," *Broadcasting & Cable* (21 October, 1996), at 46.

[36] "Customers are gaining, whether they switch or not. Where Ameritech now competes, incumbent providers have offered better deals, added free channels, and improved customer service. Incumbents say they planned some of these enhancements long before Ameritech arrived but acknowledged they are more aggressive in competitive cities." Bryan Gruley, "Cable Companies Are Finding Days of Monopoly Are Over," *Wall Street Journal* (22 September, 1997), A1.

allowing additional entry into the Internet backbone market. With the current supply of high-speed transport links becoming increasingly congested, on the one hand, and increasingly concentrated, on the other, it makes perfect sense to invite new entrants to increase capacity and rivalry. Potential entrants such as Bell Atlantic now excluded from competing in such markets would have strong incentives to invest substantial sums in providing broader Internet backbone transport facilities, thereby improving system efficiency while providing a buffer against anti-competitive conduct in this highly concentrated sector.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.



Thomas W. Hazlett

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Contributing Editor, *Harper's Magazine*, 1984
Columnist, *Ad Forum Magazine*, 1984-1985
Contributing Editor, *Reason Magazine*, 1984-present
Commentator, "Byline," syndicated to 200 radio stations by the Associated Press, 1985-89
Economics Commentator on "Marketplace," National Public Radio, 1989-1990
Contributing Correspondent to *The Economist* (of London), 1988-1991
Editorial Board, *Contemporary Policy Issues* (Western Economic Association), 1988-1992
Monthly Columnist, "Selected Skirmishes," *Reason Magazine*, 1989-present
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Academic Advisory Board, Consumer Alert (Washington, D.C.)
Member, Mont Pelerin Society
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Adjunct Scholar, American Enterprise Institute (Washington, D.C.)
Adjunct Scholar, Cato Institute (Washington, D.C.)
Senior Fellow, Liberal Institute (Prague, Czech Republic)
Member, American Economics Association, Western Economics Association, American Law & Economics Association, Southern Economics Association

Books:

Public Policy Toward Cable Television, Volume I: The Economics of Rate Controls, co-authored with Matthew Spitzer, (Cambridge, MA: M.I.T. Press, forthcoming, 1997).

Public Policy Toward Cable Television, Volume II: Regulation and the First Amendment, co-authored with Matthew Spitzer (work in progress).

The Political Economy of Radio Spectrum Allocation (work in progress).

Publications:

"The Curious Evolution of Natural Monopoly Theory," in Robert Poole, Jr., (ed.), Unnatural Monopolies: The Case for Deregulating Public Utilities (Lexington, MA: Lexington Books, 1985).

"Private Contracting vs. Public Regulation as a Solution to the Natural Monopoly Problem," in Robert Poole, Jr., (ed.), Unnatural Monopolies: The Case for Deregulating Public Utilities (Lexington, MA: Lexington Books, 1985).

"The Economics of Discrimination in Rent Controlled Housing Markets," in Issues in Housing Discrimination (Washington, D.C.: United States Commission of Civil Rights, 1985).

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"Economic Challenges for the Next Four Years," A Conference for Journalists presented by the Foundation for American Communications, Los Angeles, California (January 1993).

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Consulting (formal and informal):
Telus, Pacific West Cable Company, Preferred Communications, Century Cable, Group W, Telesat Cablevision, Norwest Communications, Total TV, Montgomery Cable and Entertainment, Ohio Bell, Wireless Cable Association, Competitive Cable Association, U.S. Telephone Association, AT&T Wireless, Cablevision Systems, CBS, Pacific Telesis, U.S. West, Bell Atlantic, Bell South, Ameritech, Southwest Bell, Nynex, Time Warner Telecommunications, Coastal Cable, Southern New England Telephone, McClatchy Enterprises, Viacom, Tandem Computers, Guatel, White House Office of Policy, White House Council of Economic Advisers, U.S. Department of Justice, Federal Trade Commission, Federal Communications Commission, the National Telecommunications and Information Administration, Republic of El Salvador, Congressional Budget Office, County of Santa Cruz, the California Department of Justice, California Governor's Office, Progress & Freedom Foundation, the California Board of Equalization, the U.S. House Commerce Committee staff, and the U.S. Senate Commerce Committee staff.

Oral Testimony:

Before the Joint Economic Committee of Congress on the subject of urban enterprise zones, October 1981.

Before the California Public Broadcasting Commission on the subject of cable television deregulation, February 1982.

Before the Compton, California City Council, on the subject of enterprise zones, October 1982.
Before the Pacific Grove, California City Council, on the subject of local land-use regulations, February 1984.

Before the Federal Competition Board, Republic of South Africa, on the subject of monopoly and industrial concentration, June 1985.

Before the U.S. Commission on Civil Rights, on the subject of housing market discrimination, November 1985.

Before the Santa Cruz, California City Council, on the subject of municipal franchising of cable television, November 1985.

Before the U.S. District Court for Northern California, in Pacific West v. Sacramento, regarding franchise monopoly in cable television, April/May 1987.

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